

## NEW METAL ADSORBENT NANOMATERIAL AND PROCEDURE FOR OBTAINING

### Description:

Nanomaterials are of great interest to industry and technology due to their unique physico-chemical properties, high surface area, and highly active surface locations, which make them incredibly useful for a wide range of applications. Among them, magnetic nanoparticles (MNPs) and graphene oxide (GO) are of great interest. The combination of graphene sheets with MNPs has remarkable properties such as greater dispersion of the nanoparticles (less aggregates are formed), large surface area, strong superparamagnetism and excellent extraction capacity. However, despite the improvements provided by coupling, the resulting material would be limited in its applications as an extractant due to the lack of selectivity of both MNPs and GO. For this reason, they resort to their functionalization with chelating organic groups that increase the selectivity towards metal ions. The present patent includes a novel synthesis method to prepare a functionalizable magnetic nanomaterial based on the coupling of graphene oxide (GO) and magnetic nanoparticles (MNPs), which is called M @ GO. In addition, a new nanomaterial synthesized from said procedure (M @ GOPS) is included. This new material has proven to be a powerful adsorbent for metals, both transitional and noble metals, so it could be used both for the purpose of decontamination of water (toxic metals), and for the extraction and recycling of high added value metals (noble metals).

### Keywords:

[Decontamination](#), [Magnetic Nanomaterial](#), [Adsorbent](#), [Heavy Metals](#), [Noble Metals](#)

### Sectors:

[Engineering](#), [Environment and Energy](#), [Chemistry](#)

### Areas:

[Industrial](#), [Nanotechnology](#), [Chemistry](#), [Materials](#), [Technological Improvements](#), [Procedures](#)



### Advantages:

The advantages of this procedure and new material are: - The coupling of the MNPs on the GO sheets allows the extraction of metals quickly by means of a magnetic field, without the need to filter or centrifuge. - High average life of the adsorbent compared to other similar materials, making it reusable. - The new synthetic route increases functionalization performance compared to other published methodologies for preparing similar materials.

### Uses and Applications:

The present invention belongs to the nanotechnology sector. The patented compound, being an excellent adsorbent for noble and transition metals, has possibilities of application in different sectors. It could be used as an adsorbent material for heavy metals, some of them highly toxic such as mercury, with the aim of decontamination and treatment of discharges in water. Another important application is the recycling or recovery of highly valued items on the market, such as silver, gold, etc.

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